AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A method for controlling automatic downshifting in a vehicular automated mechanical transmission system (10) for a vehicle comprising a fuel-controlled engine (12), a multiple-speed mechanical transmission (14), and a controller (28) for receiving input signals (30) including one or more of signals indicative of throttle position (THL), engine speed (ES), engaged gear ratio (GR) and vehicle speed (OS), and for processing said input signals in accordance with with logic rules to issue command output signals (32) to transmission system actuators including a transmission actuator (52) effective to shift said transmission, said method including the steps of:

determining a default value for an engine speed reference value ($ES_{DES\text{-}DEFAULT}$), and, if a downshift from a currently engaged ratio (GR) is indicated ($ES < ES_{D/S}$), determining by said processing if a skip downshift from the currently engaged ratio is desirable by determining an estimated engine speed at completion of the skip downshift, comparing said estimated speed to said engine speed reference value (ES_{DES}), deeming said skip downshift desirable if said estimated speed is less than said engine speed reference value, and commanding the skip downshift if deemed desirable, said method characterized by:

(i) sensing throttle position (THL);

(ii) comparing said throttle position to a performance reference value (REF) equal to at least 80% of full throttle;

(iii) if (a) during the step of determining whether the skip downshift is deemed desirable and (b) said throttle position is less than said performance reference value (TLH < REF), causing said engine speed reference value to equal the default value thereof ($ES_{DES} = ES_{DES\text{-}DEFAULT}$); and

(iv) if (a) during the step of determining whether the skip downshift is deemed desirable and (b) said throttle position exceeds said performance reference value, causing said engine speed reference value to equal the sum of an offset value and said default value ($ES_{DES} = ES_{DES\text{-}DEFAULT} + \text{offset}$), said offset value equal to about 50-150 RPM.

2. (original): The method of claim 1 wherein said default value is about 1600 RPM and said engine is a diesel engine having a rated speed of about 2100 RPM.

3. (original): The method of claim 3 wherein said default value is about 1600 RPM and said engine is a diesel engine having a rated speed of about 2100 RPM.

4. (original): The method of claim 1 wherein said offset value has a fixed value.

5. (original): The method of claim 1 wherein said offset has a value which varies with throttle position.

6. (currently amended): A method for controlling automatic downshifting in a vehicular automated mechanical transmission system (10) for a vehicle comprising a fuel-controlled engine (12), a multiple-speed mechanical transmission (14), and a controller (28) for receiving input signals (30) including one or more of signals indicative of engine speed (ES), engaged gear ratio (GR) and vehicle speed (OS), and to process said input signals in accordance with with logic rules to issue command output signals (32) to transmission system actuators including a transmission actuator (52) effective to shift said transmission, said method including:

(a) determining, as a function of throttle position, a downshift engine speed ($ES_{D/S}$) at which a downshift from a currently engaged ratio (GR) is indicated;

(b) comparing engine speed (ES) to the downshift engine speed;

(c) determining a first engine speed reference value (ES_{DES}) and a second engine speed reference value (ES_{MAX}), said second engine speed reference value greater than said first engine speed reference value ($ES_{MAX} > ES_{DES}$); and

(d) if said downshift from said currently engaged ratio (GR) is indicated ($ES < ES_{D/S}$), in sequence:

(i) determining if a skip downshift of two ratios from the currently engaged ratio ($GR_{TARGET} = GR - 2$) is desirable by determining an estimated engine speed at completion of said skip downshift of two ratios ($ES_{GR - 2}$), comparing said estimated speed to said first reference value, deeming said skip downshift of two ratios desirable if said estimated speed is less than said first reference value ($ES_{(GR - 2)} < ES_{DES}$) and commanding said skip downshift of two ratios if deemed desirable; if not,

(ii) then determining if a downshift of one ratio from the currently engaged ratio ($GR_{TARGET} = GR - 1$) is desirable by determining the expected engine speed at completion of said downshift of one ratio ($ES_{GR - 1}$), comparing said estimated speed to said second reference value, deeming said downshift of one ratio desirable if said estimated speed is less than said second reference value ($ES_{(GR - 1)} < ES_{MAX}$) and commanding said downshift of one ratio if deemed desirable; if not,

(iii) then retaining the transmission in the currently engaged ratio; said method characterized by:

(i) sensing throttle position (THL);

(ii) comparing said throttle position to a performance reference value (REF) equal to at least 80% of full throttle;

(iii) if (a) during the step of determining whether the skip downshift is deemed desirable and (b) said throttle position is less than said performance reference value (TLH < REF), causing said first engine speed reference value to equal a default value thereof ($ES_{DES} = ES_{DES\text{-}DEFAULT}$); and

(iv) if (a) during the step of determining whether the skip downshift is deemed desirable and (b) said throttle position exceeds said performance reference value, causing said first engine speed reference value to equal the sum of an offset value and said default value ($ES_{DES} = ES_{DES\text{-}DEFAULT}$ + offset), said offset value equal to about 50-150 RPM.

7. (original): The method of claim 6 wherein said default value is about 1600 RPM and said engine is a diesel engine having a rated speed of about 2100 RPM.

8. (currently amended): A control system for controlling automatic downshifting in a vehicular automated mechanical transmission system (10) for a vehicle comprising a diesel engine (12) having a rated speed of about 2100 RPM, a multiple-speed mechanical transmission (14), and a controller (28) for receiving input signals (30) including one or more of signals indicative of throttle position (THL), engine speed (ES), engaged gear ratio (GR) and vehicle speed (OS), and to process said input signals in accordance with with logic rules to issue command output signals (32) to transmission system actuators including a transmission actuator (52) effective to shift said transmission, said control system including logic rules for determining a default value ($ES_{DES\text{-}DEFAULT}$) equal to about 1600 RPM for an engine speed reference value (ES_{DES}); and, if a downshift from a currently engaged ratio (GR) is indicated ($ES < ES_{D/S}$), determining by said processing if a skip downshift from the currently engaged ratio is desirable by determining an estimated engine speed at completion of the skip downshift, comparing an estimated speed to said engine speed reference value, deeming said skip downshift desirable if said estimated speed is less than said engine speed reference value ($ES_{(GR-2)} < ES_{DES}$), and commanding said skip downshift of two ratios if deemed desirable; said system characterized by logic rules effective for:

(i) sensing throttle position (THL);

(ii) comparing said throttle position to a performance reference value (REF);

(iii) if (a) during the step of determining whether the skip downshift is deemed desirable and (b) said throttle position is less than said performance reference value (TLH < REF), causing said engine speed reference value to equal the default value thereof ($ES_{DES} = ES_{DES\text{-}DEFAULT}$); and

(iv) if (a) during the step of determining whether the skip downshift is deemed desirable and (b) said throttle position exceeds said performance reference value, causing

said engine speed reference value to equal the sum of an offset value equal to about 50-150 RPM and said default value ($ES_{DES} = ES_{DES\text{-}DEFAULT}$ + offset).

9. (original): The system of claim 8 wherein said offset value has a fixed value.

10. (original): The system of claim 8 wherein said offset value has a value which varies with throttle position.